

**Abstract**

The present invention includes a wireless communication system. The wireless communication system includes a plurality of transceiver antennae. Each transceiver is spatially separate from at least one other transceiver antenna. Each transceiver antenna includes a transceiver antenna polarization. At least one transceiver antenna has a

5 polarization that is different than at least one other transceiver antenna. Each transceiver antenna transmits a corresponding data stream. The wireless communication system further includes a plurality of receiver antennae. The receiver antennae receive at least one data stream. The transceiver antenna polarization of each transceiver antenna is pre-set to optimize separability of the received data streams. A transmission channel between

10 the transceiver antennae and the receiver antennae can be estimated with a channel matrix. The pre-set transceiver antenna polarization of each transceiver antenna can be determined by minimizing a singular value spread of the channel matrix. A pre-set receiver antenna polarization of each receiver antenna can also be determined by minimizing a singular value spread of the channel matrix.